

TO: Magalie Roman Salas  
Secretary

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FROM: Jessica Rosenworcel  
Attorney Advisor, Common Carrier Bureau

**Federal Communications Commission**  
**Office of Secretary**

RE: Presentation by Turnstone Systems  
CC Docket No. 98-147  
CC Docket No. 96-98

DATE: August 14, 2000

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On August 8, 2000, Turnstone Systems presented the attached materials regarding carrier access to xDSL testing equipment to individuals from the Office of Engineering and Technology and the Common Carrier Bureau's Policy and Program Planning division. This presentation was followed by an August 11, 2000 e-mail from Jane Wasson of Turnstone Systems summarizing issues discussed during the August 8 meeting. This e-mail is also attached.

Please file these materials in CC Docket Nos. 98-147 and 96-98.

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## Turnstone Systems

The Loop Management Company

[www.turnstone.com](http://www.turnstone.com)

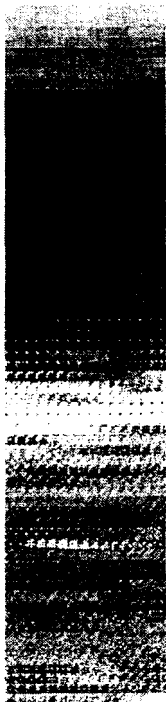
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## Challenges in Deploying DSL

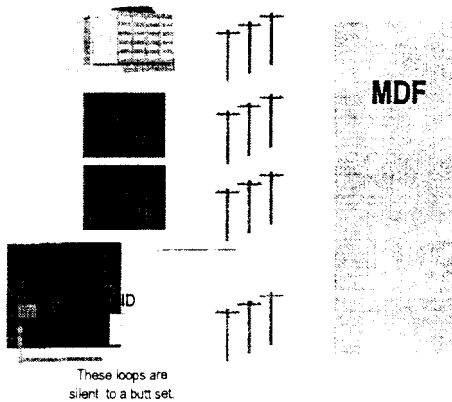
- **Real issues are not standards, technology or price, but . . .**
  - Delays in establishing service (and revenue)
  - Loop qualification, monitoring, troubleshooting, fault isolation and repair
  - It all takes too long and is prone to human errors
  - CLEC versus ILEC problem resolution
- **Infrastructure is optimized for POTS and regulated monopoly**
  - DSL provisioning requires different tools and procedures
  - Dry copper (no POTS) presents some special challenges
  - How to guarantee high availability with advanced DSL services



## Life in a Deregulated World



### Central Office



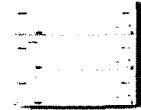
These loops are  
silent to a butt set

IDF



An ILEC serviceperson is  
required to manually test  
change, repair, upgrade

Voice Switch

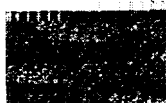


CLEC Collocation



DSLAM

A CLEC truck roll is  
required to manually test  
change, repair, upgrade





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## A New Way of Managing Copper

### Loop & Equipment Testing

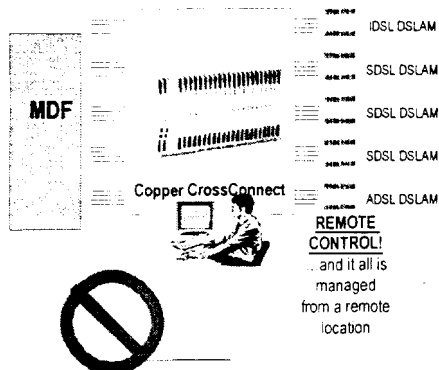
During installation, or in response to a failure report, a test probe can be attached remotely to isolate the loop or equipment fault.

### Protection Switching

If a port or linecard fails, the affected subscribers can instantly be crossconnected to spare equipment.

### Service Change

When a subscriber upgrades to a new service, the loop can be remotely crossconnected to new equipment as soon as the new CPE is installed.



### Audible Loop Identification

When a technician installs the CPE-side of a local loop, audible signals confirm proper connection.

### Periodic Monitoring

On a regular basis, a test probe can be passively added to any circuit to evaluate operation.



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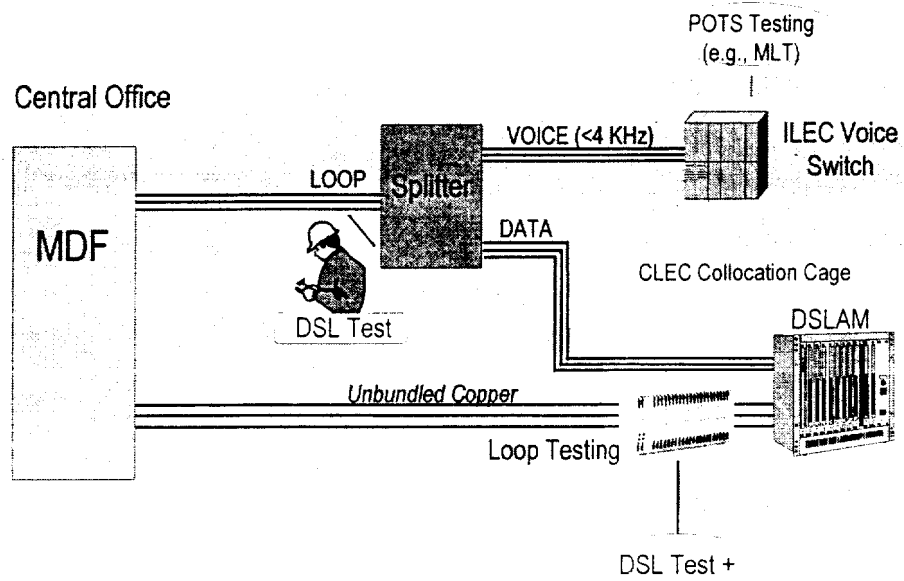
## Line Sharing Applications

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## Generic Line Sharing



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## Issues



- - **CLEC must have test access to line side of the splitter (full bandwidth) to enable basic DSL loop qualification, test & maintenance**
    - Check loop length, load coils, bridge tap, cabling errors, etc.
    - Automated versus manual
  - **ILEC must ensure no impact to POTS service**
    - High-pass filter to guarantee POTS interoperability
    - Zero ILEC management or maintenance
    - Demonstrable robustness to protect POTS service -- especially 911
    - No POTS service impact inconsistent with MLT equivalent
  - **Who owns and controls splitter and loop testing solution?**
    - Cost & Complexity
    - Management interfaces & access



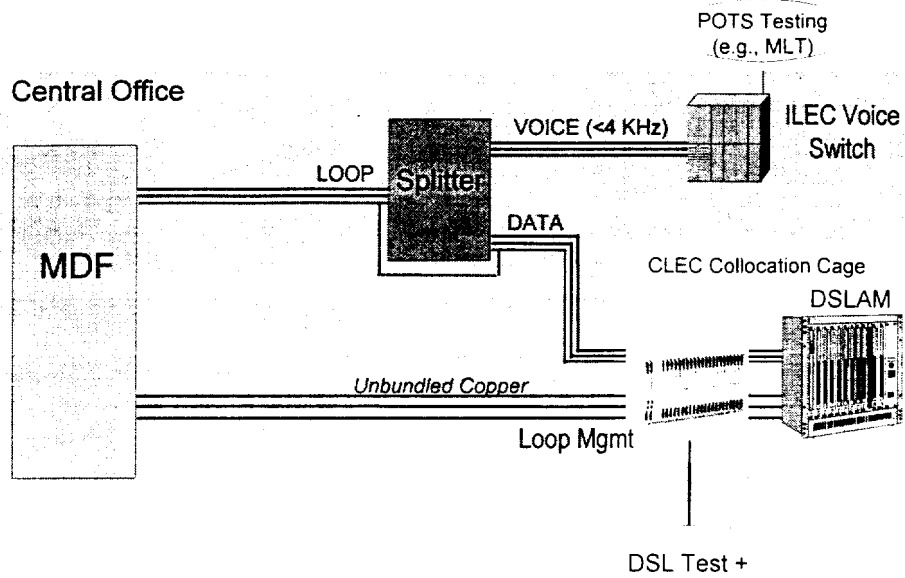


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## FCC Ruling: Maintenance, Testing & Repair

- “Incumbent LECs must provide, on a nondiscriminatory basis, physical loop test access points to requesting carriers at the splitter, through a cross-connection to the competitor’s collocation space, or through a standardized interface, such as an intermediate distribution frame or a test access server, for the purposes of loop testing, maintenance, and repair activities”.
- “An incumbent seeking to utilize an alternative physical access methodology may request approval to do so from the relevant state commission, but must show that the proposed alternative method is reasonable, nondiscriminatory, and will not disadvantage a requesting carriers’s ability to perform loop or service testing, maintenance or repair.”

# Metallic Bypass Splitter



## Remote Splitter Bypass Solution



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- - CLEC's Loop Management platform initiates test request by signaling in-line to Splitter
  - Uses same procedures as MLT to ensure the line is not in use and minimize disruption to the POTS line
  - If line not in use, splitter connects loop side to data side, to enable CLEC full metallic access to loop for DSL testing and maintenance
  - After test, or within a maximum allowable amount of time, splitter reconnects loop side to splitter, restoring the line to its original state
    - Passive design guaranteeing POTS fall-back in case of power failure and/or processor failure



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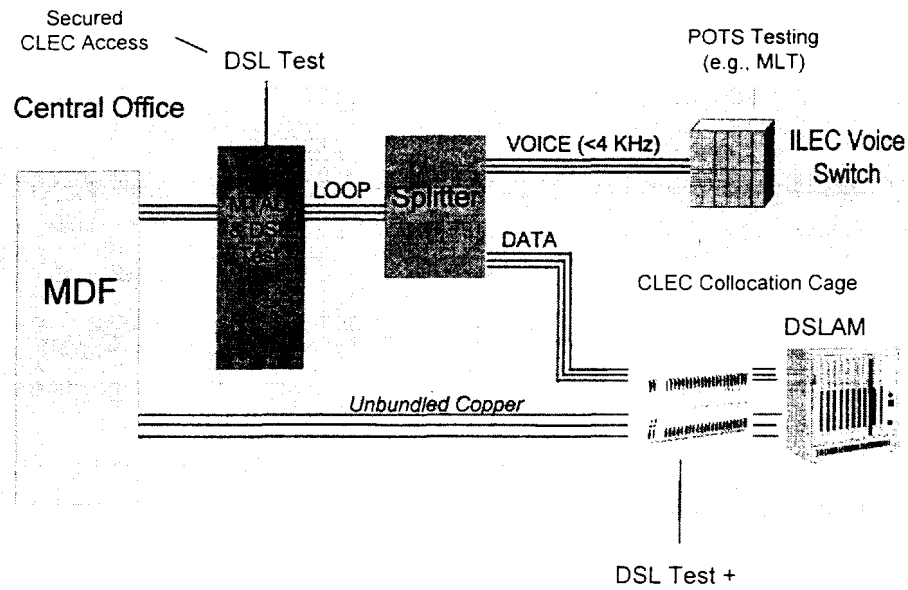
## Benefits

- CLECs and ILECs are decoupled, each leverages their own systems for their own part of the network
- Minimal cabling requirements for ILECs, just splitters
- CLECs have full loop management capabilities
  - Load coils, bridged tap, loop length, high frequency tests
  - Metallic switching for service changes, service restoration if desired
- POTS lines are protected from disruption in the same manner that the ILEC's current MLT-type solutions provide today
- Human cabling errors can be detected
  - Majority of all problems today with unbundled copper
  - CLECs can detect errors on both Loop-side and Data-Side of the splitter
- Quick Time-to-market, negligible development effort

## Metallic Access In Front of Splitter



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## Metallic Access in Front of Splitter



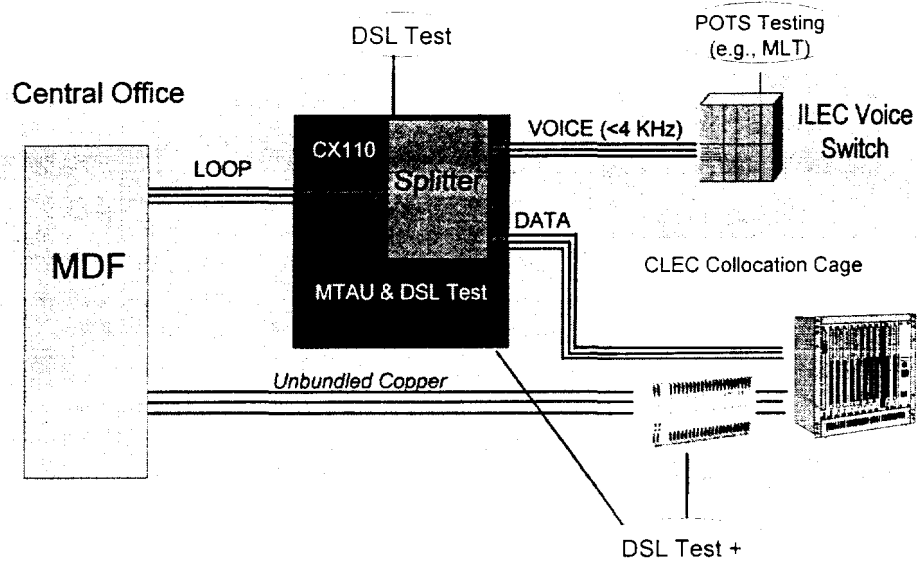
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- ILEC deploys Metallic Access and DSL test capabilities on loop-side of splitter
- Must use similar procedures as MLT to ensure the line is not in use and minimize disruption to the POTS line
- Access to the test system must be made available to both CLECs and ILECs, secured partitioning
- After test, line is restored straight-through to splitter

## Pros & Cons

- ILECs own and operate all test systems for local loop
- Partitioned Management Access may be complicated to develop
- Cabling for ILECs is more complicated (additional system)
- CLECs have most loop management capabilities
  - Load coils, bridged tap, loop length, high frequency tests
  - No Metallic switching, no visibility of cabling errors
- POTS lines are protected from disruption in the same manner that the ILEC's current MLT-type solutions provide today (assuming CX100 is used)
- Human cabling errors can not always be detected
  - Testing begins on Loop side of splitter, thus cabling errors between splitter and collocation cage can not be detected

## Integrated Splitters & Loop Mgmt





## Integrated Splitters & Loop Mgmt

- ⦿ ILEC deploys Metallic Access and DSL test capabilities with integrated splitter functionality
- ⦿ Use similar procedures as MLT to ensure the line is not in use and minimize disruption to the POTS line
- ⦿ Testing can be performed towards the loop or equipment, for full coverage
- ⦿ Access to the test system may be made available to both CLECs and ILECs, secured partitioning
- ⦿ After test, line is restored straight-through to splitter
  - Passive design guaranteeing POTS fall-back in case of power failure and/or processor failure

## Pros & Cons

- ⦿ ILECs or CLECs own and operate DSL loop management solution
- ⦿ Partitioned Management Access may be complicated to develop
- ⦿ Cabling for ILECs is simple (just splitters)
- ⦿ CLECs have all loop management capabilities
  - Load coils, bridged tap, loop length, high frequency tests
  - Metallic switching for service changes, service restoration if desired
- ⦿ POTS lines are protected from disruption in the same manner that the ILEC's current MLT-type solutions provide today (assuming CX110 is used)
- ⦿ Human cabling errors can be detected